

### **REMARKS**

Claims 8 and 12 have been amended and Claim 11 has been cancelled. New Claims 15-18 have been added.

Specifically, independent Claim 8 has been amended to incorporate the limitation of Claim 11 and Claim 11 has been cancelled. New Claim 15 is independent Claim 8, incorporating each limitation of Claims 9-11. New Claim 16-18 have also been added.

Applicants have also amended the specification to correct an obvious typographical error on page 13.

### **Claim Rejections – 35 USC §103**

Claims 8, 10 and 11 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,371,834 by Fujimura et al. in view of any one of U.S. Patent No. 7,025,668 by Petroski et al., U.S. Patent No. 6,284,114 by Chechik et al. or U.S. Patent No. 3,284,274 by Hulslander et al.

The Examiner states that Fujimura et al. meets all of the limitations of Claim 8, i.e., a method of manufacturing a glass substrate by polishing the glass utilizing an abrasive cloth in the final step (Abstract), except for disclosing a pad comprising a nap layer with inner and outer layer with the pores as recited. The Examiner also states that Fujimura et al. discloses that the abrasive cloth used is "not particularly restricted to any specific one (03:58-60) and that if suede like pad is used."

The Examiner states that Petroski et al., Chechik et al. or Hulslander et al., each disclose pads having smaller open pores on the top surface and a layer under with relatively larger pores or voids.

The Examiner concludes that it would have been obvious to modify the invention of Fujimura et al. by using pads as taught by any one of Petroski et al., Chechik et al. or Hulslander et al. as an alternative means depending on the operational parameters, e.g., cost.

The Examiner states that with regard to Claims 10 and 12, Fujimura et al. as modified meets the limitations, i.e., the pad or polishing cloth (e.g., MHC15A or MHC14E)

deforming between 40 to 60 micron under certain load; glass having a surface roughness of 0.15 nm (Table 3).

Applicants traverse this rejection.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

#### **Fujimura et al.**

Fujimura et al. discloses a method for polishing a glass substrate using an abrasive slurry and a "hard" abrasive cloth in a final polishing step (Abstract). The abrasive cloth is a "known" abrasive cloth. It is disclosed that:

"As such rather hard abrasive cloths, preferred are hard abrasive cloths made of foam polyurethanes which are conventionally used in a coarse polishing (primary polishing) step. The hardness of the hard abrasive cloth of a foamed polyurethane is classified into several stages and those classified into any stage may successfully be used in the present invention." (Col. 3, lines 61-67)

The Examiner states that Fujimura et al. discloses that the abrasive cloth used is not particularly restricted to any specific one, "and that if suede like pad is used." Although the Examiner's statement in this regard is unclear, the Examiner seems to be stating that Fujimura et al. discloses the use of suede as an abrasive cloth. In fact, Fujimura et al.

teach *away from* the use of suede, stating that if a suede type *soft* abrasive cloth is used, "brush mark-like linear unevenness having directional qualities is formed" (Col. 4, lines 12-13). Suede abrasive cloths are utilized in comparative examples, where Fujimura et al. conclude that "the surface roughness of the crystallized glass substrate can be further reduced by the use of a *harder* abrasive cloth in the polishing step." (Col. 7, lines 17-20, emphasis added).

In summary, Fujimura et al. teach that a hard abrasive cloth, such as foamed polyurethane, can be used in a final polishing step when preparing a glass substrate with a smooth surface. No other relevant details about the hard abrasive cloth are provided by Fujimura et al.

The Examiner concludes that it would have been obvious to modify the invention of Fujimura et al. by using pads as taught by any one of Petroski et al., Chechik et al. or Huslander et al. as an alternative means "depending on the operational parameters, e.g., cost." Applicants submit, however, that none of the proposed modifications of Fujimura et al. would arrive at the presently claimed invention.

#### **Hulslander et al.**

Hulslander et al. is directed to the fabrication of a "man-made suede material" (Col. 1, line 15) having, for example, good smoothness and improved leather-like grain break (Col. 2, lines 26-36). The material is useful as a garment and upholstery material (see, for example, Col. 17, lines 7-9). There is absolutely no disclosure or suggestion that the material is useful as a polishing pad for the polishing of glass substrates. Further, the Examiner has shown no objective reason to combine the teachings of these references. That is, the Examiner has shown no line of reasoning to conclude that one of skill in the art would be motivated to modify Fujimura et al. by substituting a polishing pad fabricated from a material that is disclosed in a reference for use in garments and upholstery.

Further, even if the proposed modification of Fujimura et al. were made, the material disclosed by Hulslander et al. does not teach or suggest all of the claim limitations. Claim 8 of the present application requires a polishing pad having a nap layer including an inner layer and an outer layer, where the inner layer includes closed cells and the outer layer includes pores that are much smaller than the closed cells. In contrast, Hulslander et al.

disclose that their material includes cells having an average diameter of 20 to 200  $\mu\text{m}$  that are contiguous, elongated perpendicular to the sheet material, and are shaped generally like a hollow cylinder. (Col. 8, lines 34-50). The cell shape is tapered, whereby the cell diameter is larger from the exposed surface of the layer toward the underlying substrate. A top layer is removed to expose the cells at the exposed surface. (Col. 9, lines 50-60). This is roughly akin to the prior art polishing pads described by Applicants at page 13, lines 13-31 with reference to Fig. 1. There is no disclosure or suggestion by Hulslander et al. of an inner layer that includes *larger closed* cells, as is required by independent Claim 8.

In view of the foregoing, removal of this rejection in over Fujimura et al. and Hulslander et al. is requested.

#### **Chechik et al.**

Chechik et al. is directed to a polishing pad that is useful for the planarization (chemical mechanical polishing) of semiconductor devices (see, e.g., the Abstract, Col. 1, lines 14-16 and Col. 5, lines 1-3). Unlike Fujimura et al. and the present invention, Chechik et al. is *not* directed to polishing pads and methods for polishing glass substrates, such as for use with magnetic recording media. Applicants submit that one of skill in the art trying to improve a method for polishing a glass substrate would not be motivated to consider teachings relating to the polishing and planarization of semiconductor devices. The considerations for the two methods are significantly different.

Even if Fujimura et al. (polishing a glass substrate) is modified by substituting the polishing pad of Chechik et al. (chemical mechanical polishing of a semiconductor device), the combination would not meet each limitation of the present invention. There is no disclosure by Chechik et al. that the polishing pad has a nap layer that includes an inner layer and an outer layer, where the inner layer includes closed cells and the outer layer includes pores that are much smaller than the closed cells. Fig. 1 of Chechik et al. (discussed at Col. 6, lines 19-34) does not illustrate such a structure, but merely illustrates a porous material **10** having recesses **14** formed by the open pores on the surface. There is *no inner layer* including closed cells.

In view of the foregoing, removal of this rejection over Fujimura et al. and Chechik et al. is requested.

**Petroski et al.**

As with Chechik et al., Petroski et al. is directed to chemical mechanical polishing of semiconductor wafers, and is not directed to the polishing of glass substrates. (see, for example, the Abstract and Col. 1, lines 46-53). As is noted above, Applicants submit that one of skill in the art trying to improve a method for polishing a glass substrate would not be motivated to consider teachings relating to the polishing and planarization of semiconductor devices.

Further, even if Fujimura et al. is modified by substituting the polishing pad of Petroski et al., all of the claim limitations of independent Claim 8 would not be met. The polishing pad of Petroski et al. is made of porous, paper-making fibers bound by a thermoset resin to provide a rigid structure. (Col. 2, lines 29-33). The surface of the pad is ground to create flow channels. (Col. 2, lines 42-44). Indeed, there is no disclosure by Petroski et al. of a pore structure meeting *any* of the pore structure limitations recited in independent Claim 8.

Therefore, removal of this rejection over Fujimura et al. and Petroski et al. is requested.

In the event that the final rejections as set forth above are maintained by the Examiner, Applicants respectfully request that the Examiner point out with particularity where each reference discloses the polishing pad features recited in independent Claim 8.

The Examiner has also rejected Claims 9 and 11 under 35 U.S.C. 103(a) as being unpatentable over modified Fujimura et al. as applied to Claim 8, and further in view of U.S. Patent No. 6,890,244 by Hsu et al.

The Examiner states that Fujimura et al. as modified by Petroski et al., Chechik et al. or Hulslander et al. discloses using polyurethane pads meeting all of the limitations of Claims 9 and 11, except for disclosing the number and the size of the pores. The Examiner also states that it is also disclosed that the abrasive cloth used is not particularly restricted to any specific one, and that it uses 0.2 micron abrasives.

The Examiner states that Hsu et al. teaches polishing pads for use in CMP wherein the size of the pores are dictated by the size of the abrasive particles used, e.g., for 100 to

200 nm particles, pore sizes of 30 to 100 microns are preferred and it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to further modify the modified invention of Fujimura et al. with the pore sizes, e.g., 30-100 microns, as taught by Hsu et al. to enhance the operation for the abrasive used.

The Examiner states that regarding the density or the number of pores, Hsu teaches the ratio of fibers to the matrix depends on the intended use, i.e., higher ratio for more compressive pad. The Examiner concludes that it would have been obvious to one having ordinary skill in the art to use e.g., 500 pores per mm square, dependent on work-piece/operational parameters, involves only routine skill in the art, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Applicants traverse this rejection. First, Applicants note that Hsu et al. is directed to chemical mechanical polishing of semiconductor devices. As is noted above with respect to Petroski et al. and Chechik et al., one of skill in the art trying to improve a method for polishing a glass substrate would not be motivated to consider teachings relating to the polishing and planarization of semiconductor devices, as the considerations for the two methods are significantly different.

Even if one of the foregoing combinations of references is further modified by Hsu et al., such a combination still does not disclose or suggest the present invention. Hsu et al. discloses that the polishing pad can include fibers that dissolve at the initiation of polishing, and that the fibers can have a diameter of 20 to 200  $\mu\text{m}$ . However, like the foregoing references relied upon by the Examiner, Hsu et al. does not disclose or suggest a nap layer including an inner layer and an outer layer, where the inner layer includes closed cells and the outer layer includes pores that are much *smaller* than the closed cells. This feature is simply not disclosed or suggested by any of the references relied upon by the Examiner.

Therefore, removal of this rejection is also requested.

### **Obviousness-Type Double Patenting**

Claims 8-12 have been finally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims of U.S. Patent No. 6,736,705 by Benning et al.; U.S. Patent No. 6,749,487 by Okuhata et al.; U.S. Patent No. 6,852,003 by Tajima et al.; and U.S. Patent No. 6,932,677 by Nakano et al. in view of the prior cited art. The Examiner states that these patents read over the claimed subject matter of the claims, except for specific pad properties, all obvious to one of ordinary skill in view of prior art cited above.

First, Applicants note that U.S. Patent No. 6,736,705 is not commonly-owned with the present application, and therefore this rejection is improper and removal thereof is requested.

Further, a nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); and *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985). Obviousness-type double patenting requires rejection of an application claim when the claimed subject matter is *not patentably distinct* from the subject matter claimed in a commonly owned patent, when the issuance of a second patent would provide unjustified extension of the term of the right to exclude granted by a patent. See *Eli Lilly & Co. v. Barr Labs., Inc.*, 251 F.3d 955, 58 USPQ2d 1869 (Fed. Cir. 2001); *Ex parte Davis*, 56 USPQ2d 1434, 1435-36 (Bd. Pat. App. & Inter. 2000). When considering whether the invention defined in a claim of an application would have been an obvious variation of the invention defined in the claim of a patent, the disclosure of the patent may not be used as prior art. *General Foods Corp. v. Studiengesellschaft Kohle mbH*, 972 F.2d 1272, 1279, 23 USPQ2d 1839, 1846 (Fed. Cir. 1992).

Thus, an obviousness-type double patenting rejection is appropriate when the claimed subject matter in the application is obvious in view of the subject matter *claimed* in a commonly owned patent. Applicants submit that none of U.S. Patent Nos. 6,749,487,

6,852,003 or 6,932,677 include claims that obviate the claims of the present application. In the event that the Examiner maintains this rejection, Applicants request that the Examiner specify how the claims of these patents obviate the presently claimed invention.

Applicants have added new Claims 15-18 and request entry and examination of these new claims. New independent Claim 15 is Claim 8, written to incorporate the limitations of each of Claims 9, 10 and 11. Applicants submit that none of the prior references, alone or in any combination, disclose each of these features recited in Claim 15. New Claim 16-18 have also been added and examination and entry of these claims is also requested.

Applicants do not believe that any additional fees are due with regard to this Response to Office Action. However, if any fees are due, please debit those fees from Deposit Account No. 50-1419.

Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecute and or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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